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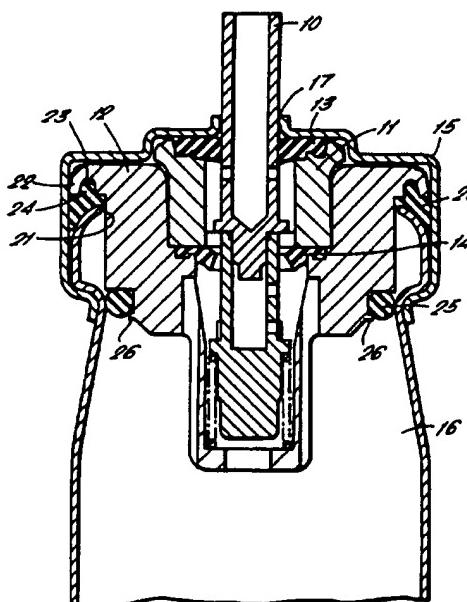
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(54) Seal arrangement for pressurised dispensing containers

(57) A pressurised dispensing apparatus comprising a container for product to be dispensed and valve means for controlling outflow of product from the container. The valve including a valve body 12 located within the container, the container comprising an open-ended container body and a cap 15 fixedly attached to the container body for closing the open end thereof. The cap having an annular side wall extending around at least an upper end of the container body. The apparatus further comprises a first seal 20 located in sealing engagement between the container body and the cap and a second seal 25 located in sealing engagement between the valve body and the container. The valve body contains a stem 10 that slides in an annular measuring chamber 11. The first and second seals may be spaced apart, as shown, or adjacent and in sealing engagement, Fig.3.

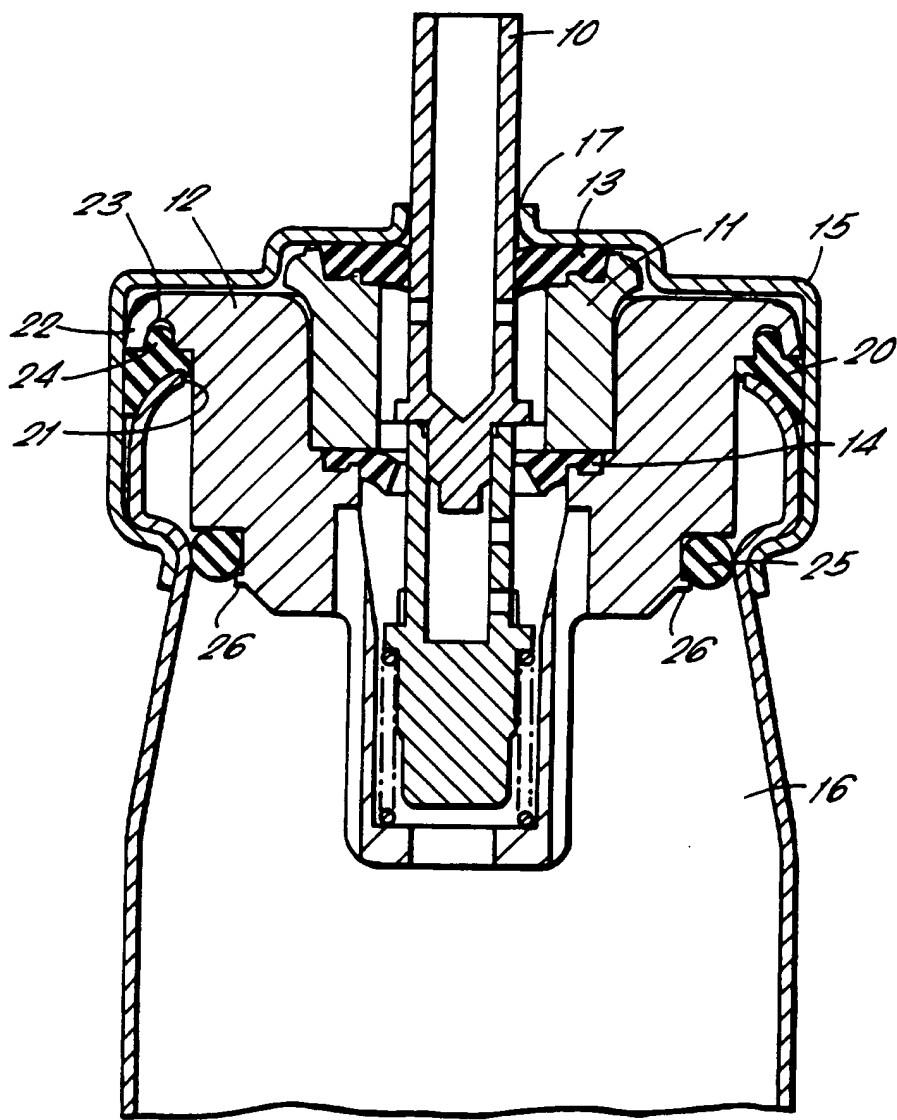
FIG. 1.



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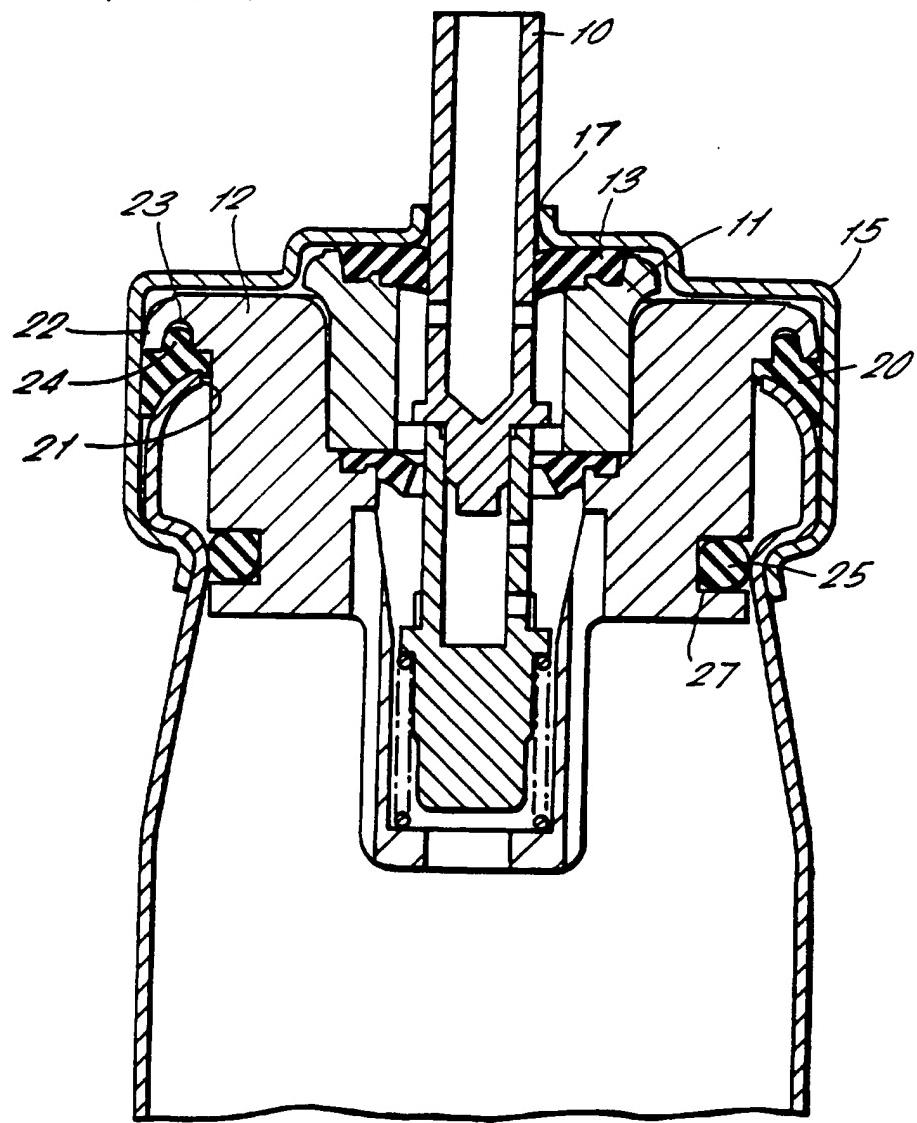
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FIG. 1.



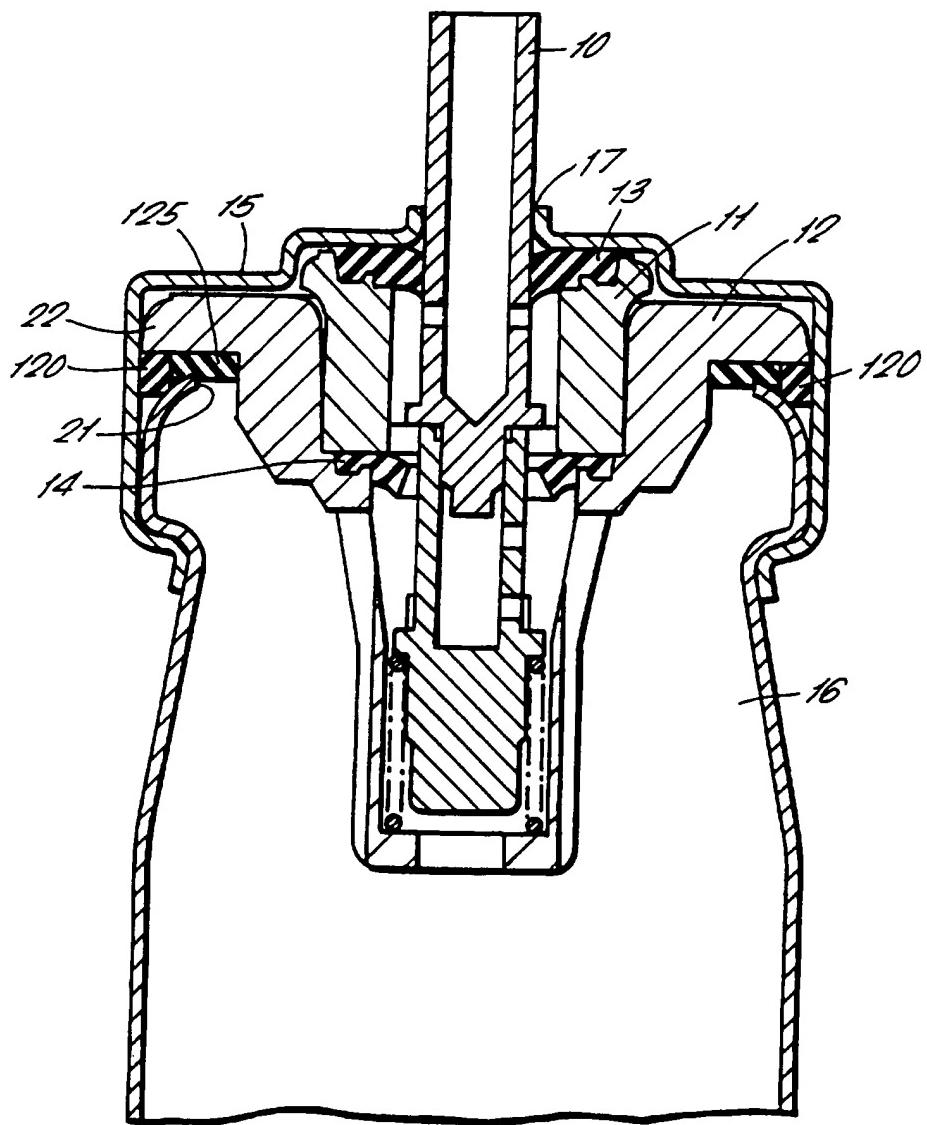
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FIG. 2.



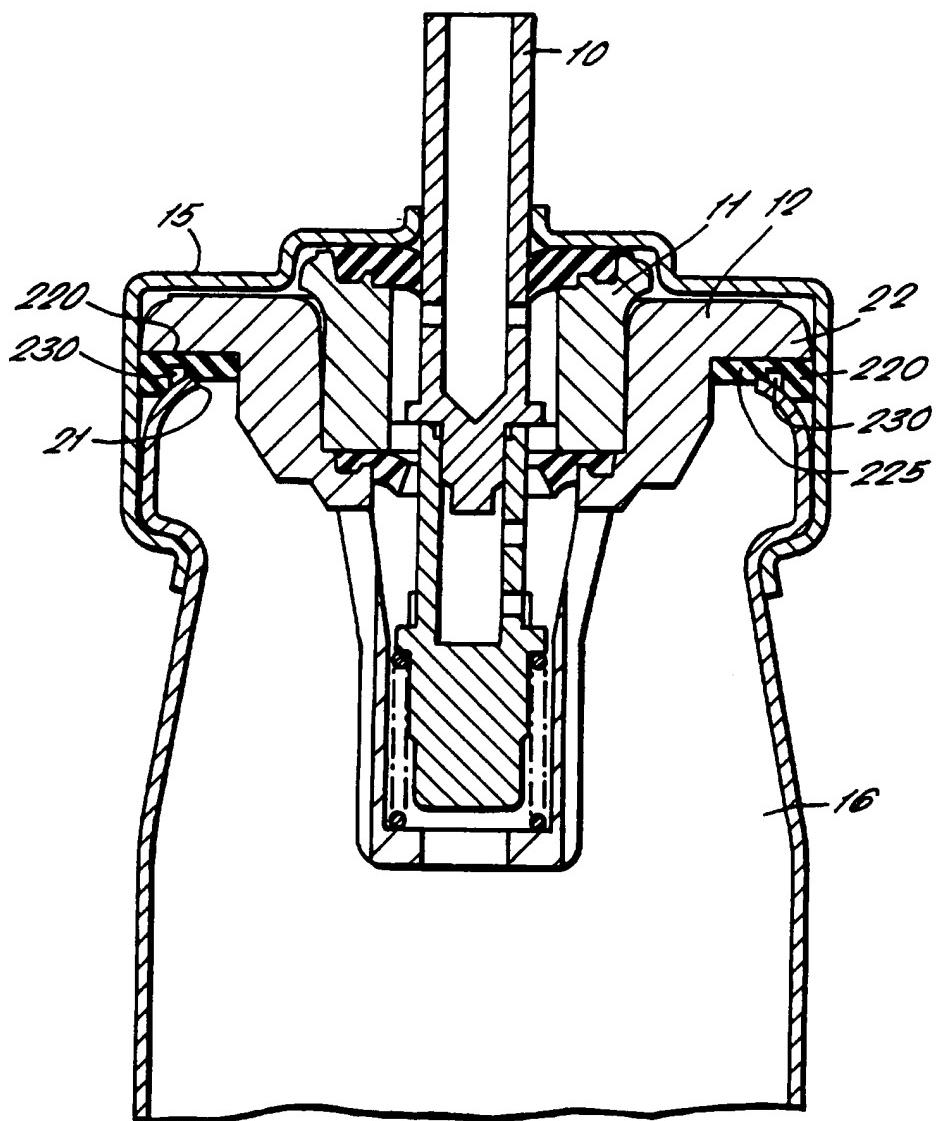
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FIG. 3.



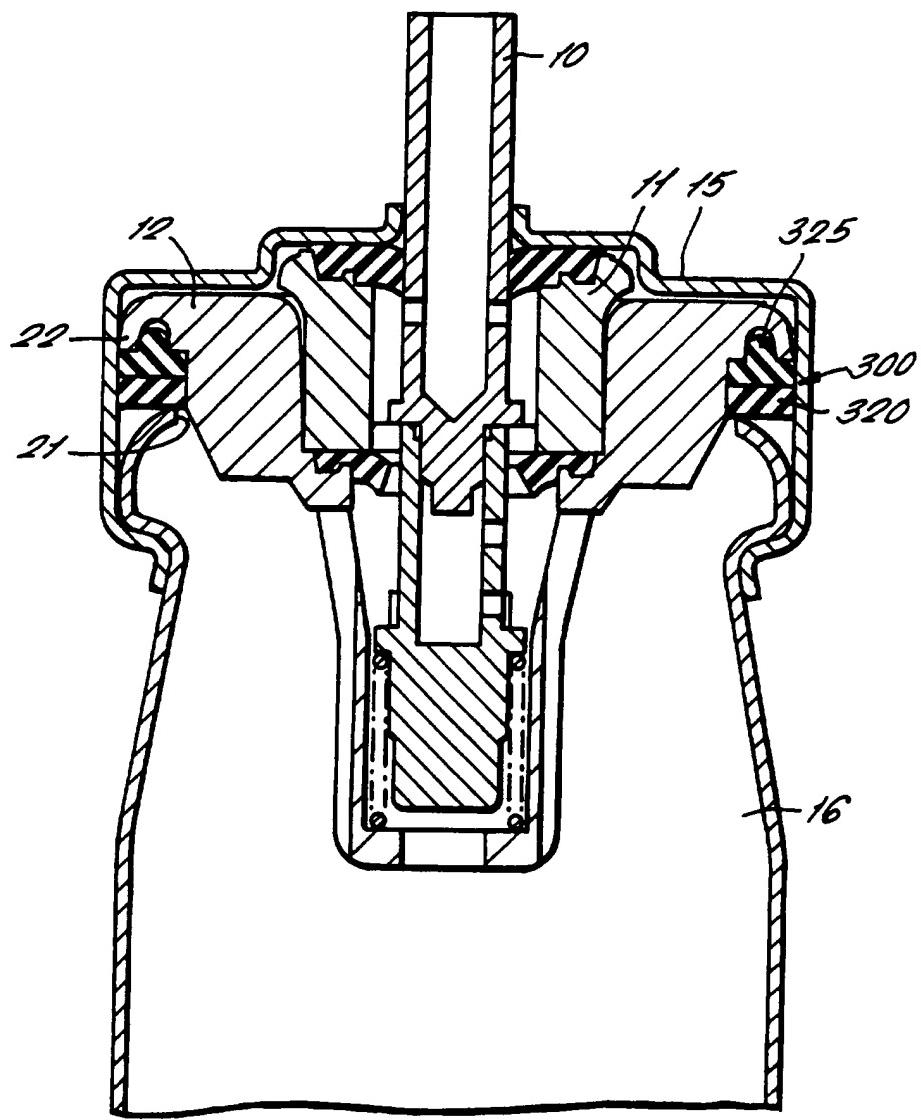
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FIG. 4.



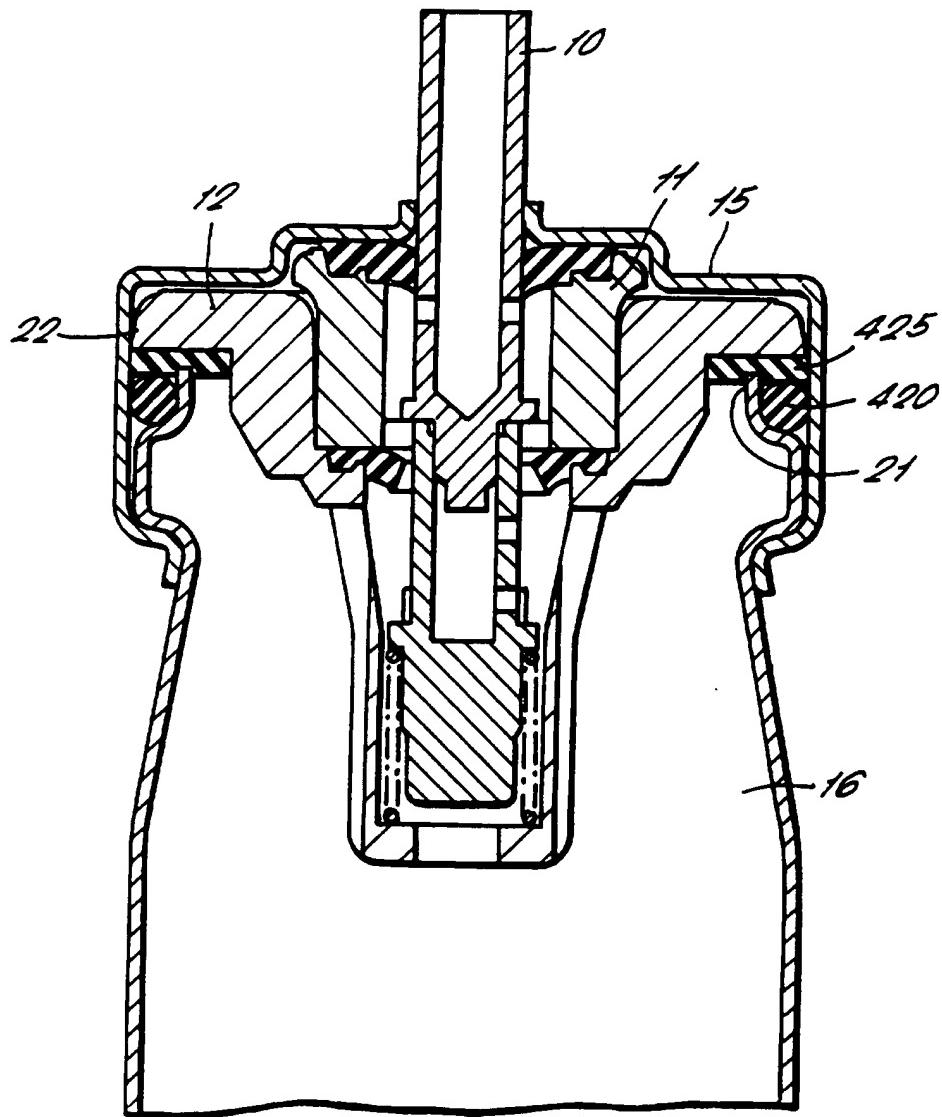
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FIG. 5.



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FIG. 6.



IMPROVED SEAL ARRANGEMENTS FOR
PRESSURISED DISPENSING CONTAINERS

5 The invention relates to pressurised dispensing containers with an improved seal arrangement.

10 Pressurised dispensing containers are used for dispensing a wide variety of products from mobile to viscous liquid products, powdered products and the like and typically employ a liquid propellant such as a hydrocarbon or fluocarbon having sufficiently high vapour pressure at normal working temperatures to propel the product through the dispensing apparatus. These are commonly used for dispensing pharmaceuticals and medicaments.

15 Generally such pressurised dispensing containers comprise a container, a dispensing valve and a cap which is crimped to the container to hold the valve in place. A seal, usually made of an elastomeric material, is compressed between the container and the cap to prevent leakage. The efficiency of the sealing arrangement is particularly important to prevent the leakage of propellants, which are known to cause environmental and safety hazards, and of the contents of the dispensing containers, which could also lead to 20 a health hazard or simply constitute wastage.

25 It has hitherto been a problem that the deformation of the seal during the crimping operation can lead to a reduction in the effectiveness of the seal. During the crimping operation, the seal may 30 also be deformed in a manner which does not provide a true seal.

35 To overcome such problems it has been proposed to use two seals, both of which are sandwiched between the container and the cap. An example of such proposal is described in International patent

specification WO94/25373.

It is an object of the present invention to provide a further improved sealing arrangement for pressurised dispensing containers.

5 According to the invention there is therefore provided pressurised dispensing apparatus comprising a container for product to be dispensed, valve means for controlling outflow of product from the container, said valve including a valve body located within the
10 container, said container comprising an open ended container body and a cap fixedly attached to said container body for closing the open end thereof, said cap having an annular sidewall extending around at least an upper end of the container body, said
15 apparatus further comprising a first seal located in sealing engagement between the container body and the cap and a second seal located in sealing engagement between the valve body and the container.

Preferred embodiments of the present invention
20 will now be described, by way of example only, with reference to the accompanying drawings in which Figs. 1 to 6 illustrate a metering valve known in the prior art for use in a pressurising dispensing container incorporating alternative seal arrangements according
25 to the present invention.

Referring to Figs. 1 and 2 a metering valve comprises a valve member 10 in the form of a valve stem which is axially slidable within an annular metering chamber 11. The metering chamber 11 and a
30 portion of the valve member 10 are located within a valve body 12. An outer seal 13 and an inner seal 14 extend radially between the valve member 10 and the chamber 11. The outer seal 13 is sandwiched between an upper end of the metering chamber 11 and a cap or ferrule 15 which is crimped to a container body 16

covering an open end thereon, thus providing a closed container holding the product to be dispensed. The cap 15 has a central aperture 17 through which the valve member 10 extends. Depression of the valve
5 member 10 causes the product to exit the container 16 from the chamber 11 through a passageway in the valve member 10. The form and operation of the metering valve may be selected as required.

The first seal 20 of the seal arrangement of the
10 present invention is located between an external surface of the upper end of the container body 16 and an inner surface of an annular sidewall of the cap 15. In the embodiments of the invention shown in Figs. 1 and 2, the first seal 20 is provided by a gasket in
15 sealing engagement with the rim forming the annular opening 21 of the container body 16. The first seal 20 is further in sealing engagement with a flanged section 22 of the valve body 12. In Figs. 1 and 2 this flanged section also has an annular groove 23 which receives an annular ring 24 projecting from the first seal 20. This groove and ring arrangement 23,
20 24 is optional, and helps to locate and hold the first seal 20 in position relative to the valve body 12, especially during the fitting and crimping operations.

A second seal 25, shown in Figs. 1 and 2 as an O-ring, is provided in sealing engagement with an internal surface of the container body 16, preferably at a neck portion thereof, and the valve body 12. The second seal 25 may be retained by retention nodules 26
25 as illustrated in Fig. 1 or within an annular groove 27 in the valve body 12 as illustrated in Fig. 2.

The second seal 25 thus seals off the main body of the container body 16 from the first seal 20. This relieves the pressure on the first seal 20. Thus if
30 35 that seal is weakened during the crimping operation,

the integrity of the overall seal will be less effected. Furthermore, the second seal 25 limits the quantity of propellant or product which can reach the first seal 20. Thus if there is a problem in the 5 efficiency of that seal, again a quantity of leakage can be reduced significantly. As the second seal 25 is not in contact with the cap 15, it is unaffected by the crimping operation. This provides extra security in the event that the first seal 20 is damaged in the 10 crimping operation.

Referring now to Fig. 3, the parts corresponding to the embodiments of Fig. 1 and Fig. 2 are numbered similarly. However, whereas the first and second seal 20, 25 are arranged remotely from each other in Fig. 1 15 or Fig. 2, they are arranged adjacent and in sealing contact with each other in Fig. 3. The first seal 120 again is in sealing contact with a section of an upper end of the container body 16, although not with the annular opening 21 of the container body 16. The 20 first seal 120 is also in sealing contact with the inner surface of the cap 15 and the flanged section 22 of the valve body 12. There is no annular groove and ring arrangement 23, 24 in this embodiment, although this is optional. The second seal 125 is in sealing 25 contact with the valve body 12, the annular opening 21 of the container 16 and the first seal 120. The second seal 125 thus still serves the purpose of isolating the first valve 120 from the main pressure within the container body 16 and the product contained 30 therein.

Referring to the embodiment of the invention shown in Fig. 4, the first and second seals are provided by a gasket 200 having two sealing bands 220 and 225. These sealing bands 220, 225 provide the 35 first and second seals respectively and are in the

same sealing contacts as the first and second seals 120, 125 of Fig. 3. The sealing bands 220, 225 have an annular air gap therebetween.

In Fig. 5 a further embodiment of the invention
5 is illustrated. In this embodiment the first and
second seals 320, 325 are provided by a double gasket
300. The first seal 320 is in a sealing engagement
with the sidewall of the cap 15, the annular opening
21 of the container body 16 and the valve body 12.
10 The second seal 325 is arranged above the first seal
320 in sealing contact therewith and also in sealing
contact with the valve body 12 and the cap 15. The
first seal 320 is preferably a low density
polyethylene anti-extrusion ring.

15 In Fig. 6 yet another embodiment of the present
invention is illustrated. In this embodiment, the
first seal 420 is provided by an O-ring located in a
retaining collar formed by the upper end of the
container body 16 adjacent the annular opening 21.
20 The second seal 425 is in sealing contact with the
first seal 420, the cap 15 and the valve body 12. In
this embodiment, as in Figs. 1 to 4, the second seal
425 isolates the first seal 420 from the pressure and
contents of the container body 16.

25 The first and second seals of all of the
embodiments of the invention can be made from any
appropriate material, including elastomers, rubbers
(including nitrile rubbers), thermoplastics and so on.
If the dispensing container is used for medicinal or
30 pharmaceutical formulations, then an appropriate seal
material must be selected which does not contaminate
the product.

35 Preferably the second seal is made of an
ethylene-propylene-diene rubber ("EPDM"). Optimally
the first seal is also an EPDM gasket seal.

Dispensing apparatus according to the present invention with seals from such materials, one of particular use when propellants such as HFC-134a or HFC-227 are involved.

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CLAIMS:

1. Pressurised dispensing apparatus comprising a container for product to be dispensed, valve means for controlling outflow of product from the container, said valve including a valve body located within the container, said container comprising an open ended container body and a cap fixedly attached to said container body for closing the open end thereof, said cap having an annular sidewall extending around at least an upper end of the container body, said apparatus further comprising a first seal located in sealing engagement between the container body and the cap and a second seal located in sealing engagement between the valve body and the container.
2. Pressurised dispensing apparatus as claimed in claim 1 in which the second seal is located in sealing engagement between the valve body and the container body.
3. Pressurised dispensing apparatus as claimed in claim 1 in which the second seal is located in sealing engagement between the valve body and the cap sidewall.
4. Pressurised dispensing apparatus as claimed in any one of the preceding claims in which the first and second seals comprise independent seal members.
5. Pressurised dispensing apparatus as claimed in any one of claims 1 to 4 in which at least one of the seals is an O-ring.
- 35 6. Pressurised dispensing apparatus as claimed in

any one of the preceding claims in which the second seal is located in an annular groove in an external surface of the valve body.

- 5 7. Pressurised dispensing apparatus as claimed in any one of the preceding claims in which the second seal is held in position on the valve body by means of locating nodules.
- 10 8. Pressurised dispensing apparatus as claimed in any one of the preceding claims in which the first and second seals are located adjacent to and in sealing contact with each other.
- 15 9. Pressurised dispensing apparatus as claimed in any one of claims 1 to 3 in which the first and second seals are provided by a single seal member having two sealing elements.
- 20 10. Pressurised dispensing apparatus as claimed in claim 9 in which the seal member comprises an annular gasket and the sealing elements comprise a pair of concentric sealing rings projecting from an annular sealing face of the gasket.
- 25 11. Pressurised dispensing apparatus as claimed in claim 10 in which an annular gap is provided between the concentric sealing rings.
- 30 12. Pressurised dispensing apparatus as claimed in any one of the preceding claims in which the first seal is also in sealing engagement with the valve body.
- 35 13. Pressurised dispensing apparatus as claimed in

any one of the preceding claims in which the second seal is in sealing engagement with both the container body and the cap.

5 14. Pressurised dispensing apparatus as claimed in any one of the preceding claims in which the first seal is positioned on the external surface of the container body in an annular indented portion.

10 15. Pressurised dispensing apparatus as claimed in any one of the preceding claims in which the valve body has a radially extended flange extending between a main body portion and the sidewall of the cap.

15 16. Pressurised dispensing apparatus as claimed in claim 15 in which a transverse face of the flange provides a seat for engagement with at least one of the seals.

20 17. Pressurised dispensing apparatus as claimed in claim 16 in which an annular groove is provided in the transverse face of the flange for receiving a corresponding projection on one or more of the seals in contact therewith.

25 18. Pressurised dispensing apparatus as claimed in any one of claims 15 to 17 in which the flange provides a further seal between the valve body and the cap.

30 19. Pressurised dispensing apparatus substantially as hereinbefore described with reference to and as shown in the accompanying drawings.



The
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Application No: GB 9523457.1
Claims searched: All

Examiner: J. C. Barnes-Paddock
Date of search: 31 January 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): F1R (RBB RCC)

Int Cl (Ed.6): B65D 83/14

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	US 4,271,875 (MESHBERG) Figs. 1, 8. Note cap 39, gasket 49, diaphragm 35, and body 51	1,2
A	EP 0,281,730 (TOKAI) Figs 1, 5. A solution without a cap.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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